

IN THE CLAIMS

No claim is currently amended.

1. (Previously Presented) An apparatus adapted for *in vitro* conditioning of cells prior to a cell therapy administrated into a body having a myocardium, the apparatus comprising:

    a culturing module to host the cells and a culturing medium;

    a cardiac electrical stimulator coupled to the culturing module and adapted to create cardiac electrical conditions in the culturing medium by delivering electrical stimuli, the cardiac electrical conditions simulating electrical conditions in the myocardium that result in cardiac contraction;

    a myocardial stress simulator coupled to the culturing module and adapted to create a mechanical stress upon the cells by delivering mechanical stimuli, the mechanical stress simulating a tension applied upon cardiac muscle cells in the myocardium;

    a biological treatment administration module coupled to the culturing module and adapted to deliver a biological stimulus that enhances one or more of proliferation, engraftment, survival, and differentiation of the cells after their administration into the body, the biological treatment administration module including one or more biological stimulus agents selected from protein and nucleic acid;

    a memory circuit including an instruction set for an automatic process of conditioning the cells for administration into tissue of myocardium, the instruction set defining a predetermined sequence of the electrical stimuli, the mechanical stimuli, and the biological stimuli; and

    a controller coupled to the cardiac electrical stimulator, the myocardial stress simulator, the biological treatment administration module, and the memory circuit, the controller adapted to control the cardiac electrical stimulator, the myocardial stress simulator, and the biological treatment administration module by automatically executing the instruction set.

2. (Original) The apparatus of claim 1, further comprising two or more electrodes, connected to the cardiac electrical stimulator and disposed in the culturing medium, to allow delivery of at least one electrical stimulus to the cells.

3. (Original) The apparatus of claim 2, wherein the electrical stimulator comprises a pacemaker.
4. (Original) The apparatus of claim 3, wherein the cardiac electrical stimulator comprises an electric field generator.
5. (Original) The apparatus of claim 1, wherein the culturing module comprises a deformable culturing substrate allowing the cells to be plated thereon.
6. (Original) The apparatus of claim 5, wherein the deformable culturing substrate is made of silicone.
7. (Original) The apparatus of claim 6, wherein the myocardial stress simulator comprises a variable speed motor and a mechanical linkage coupled between the variable speed motor and the deformable culturing substrate, the variable speed motor and the mechanical linkage adapted to create a calibrated cyclic mechanical tension upon the deformable culturing substrate.
8. (Previously Presented) The apparatus of claim 1, wherein the biological treatment administration module comprises one or more dispensers adapted to release the one or more biological agents into the culturing medium.
9. (Original) The apparatus of claim 8, wherein the culturing module comprises a mixer adapted to create and maintain a homogeneous culturing medium.
10. (Original) The apparatus of claim 1, further comprising a user interface coupled to the controller, the user interface including a use input accepting commands.
11. (Canceled)

12. (Previously Presented) The apparatus of claim 10, wherein the user interface comprises a display screen.

13. (Original) The apparatus of claim 12, further comprising a monitor coupled to the culturing module, the monitor adapted for observation of the cells in the culturing module.

14. (Original) The apparatus of claim 13, wherein the monitor comprises a microscope, coupled to the controller and the user interface, to allow observation of the cells on the display screen.

15-72. (Canceled)

73. (Previously Presented) The apparatus of claim 1, wherein the controller is adapted to allow adjustment of parameters in the instruction set during the *in vitro* conditioning of the cells.

74. (Previously Presented) The apparatus of claim 7, wherein the mechanical linkage is adapted to allow the culturing substrate to be stretched and relaxed in two or more directions without vibration and hesitation.

75. (Previously Presented) The apparatus of claim 1, wherein the biological treatment administration module comprises an array of dispensers each adapted to release a predetermined amount of the one or more biological stimulus agents into the culturing medium.

76. (Previously Presented) The apparatus of claim 3, wherein the controller is adapted to control a pacing voltage and a pacing pulse width.

77. (Previously Presented) The apparatus of claim 5, wherein the controller is adapted to control a frequency and a degree of cell deformation.

78. (Previously Presented) The apparatus of claim 8, wherein the controller is adapted to control a volume and a concentration of each of the one or more biological stimulus agents.

79. (Previously Presented) The apparatus of claim 14, wherein the controller is adapted to process an image of the cells and present the image on the display screen.

80. (Canceled)

81. (Previously Presented) The apparatus of claim 1, wherein the biological treatment administration module includes one or more of:

- a differentiation factor;
- a growth factor;
- an angiogenic protein;
- a survival factor;
- a cytokine; and

isolated nucleic acid molecules encoding a gene product including one or more of an angiogenic protein, a growth factor, a differentiation factor, a survival factor, a cytokine, a cardiac cell-specific structural gene product, a cardiac cell-specific transcription factor, a membrane protein, and an antisense sequence.